Implementing Pneumonia Quality Care Measures with an Informatics-Driven Intervention

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Many institutions find it difficult to achieve compliance with quality measures associated with community-acquired pneumonia. The goal of this study was to design and implement an automated pneumonia detection and management system in the Emergency Department. The system utilizes multiple information systems to improve communication among health care providers and support more timely decision making for ED patients suggestive of having pneumonia.

Many healthcare organizations and agencies, such as the Centers for Medicare and Medicaid Services (CMS) and the Joint Commission on Accreditation of Healthcare Organizations have established indicators to measure the quality of care delivered to patients with community-acquired pneumonia. The quality indicators such as administering antibiotics within 4 hours of admission have been associated with decreased length of stay, and improved inpatient and 30-day mortality. However, many institutions seem to fail in achieving the challenging goal.

The purpose of this study was to design and implement an automated pneumonia detection and management system in an adult Emergency Department (ED). The system provides the infrastructure to a) prompt clinicians to confirm the diagnosis in patients who have findings suggestive of pneumonia, and b) remind clinicians about using appropriate orders to manage the patient’s disease. We hypothesized that such an informatics infrastructure may provide a sustainable approach that can remind physicians about critical pneumonia process steps throughout the entire hospitalization. We created a system that identifies pneumonia patients and monitors the pneumonia care process measures from ED arrival to hospital discharge. The system improves communication among health care providers and supports more timely decision making for ED patients suggestive of having pneumonia. Six different applications are involved: the radiology system, the ED whiteboard, an ED Triage application, a CPOE system, an order tracking application, and the electronic medical record.

Pneumonia detection: The process relies on identifying pneumonia automatically in real-time and without the need for clinician interaction, alerting the clinician about the presence of a patient with findings suggestive of pneumonia. A keyword-matching algorithm identifies concepts compatible with pneumonia from the radiologists’ preliminary interpretation. A positive match results in a “pneumonia alert” on the ED whiteboard, prompting the clinician to review the results and confirm, reject, or defer the diagnosis of pneumonia (Figure). If confirmed or rejected the electronic medical record and the CPOE system receive a pneumonia status flag, valid during the patient’s encounter.

Pneumonia management: Once set, the pneumonia flag is utilized by several systems to facilitate correct management of the disease. The CPOE system checks for appropriate orders and reminds clinicians if orders are lacking. The electronic medical record integrates nursing, laboratory, and other data, and displays a management dashboard including relevant measures such as smoking status, facilitating the real-time monitoring of pneumonia care process measures. The pneumonia flag in the electronic medical record is used by other applications to facilitate additional pneumonia care process related reminders, such as reminders for administering the pneumococcal and influenza vaccine to eligible patients prior to hospital discharge.

The system has been implemented Jan 2007 and has been well received. It has improved timely notification among radiologists and ED clinicians, and decreased the number of chart reviews for identifying eligible pneumonia patients.